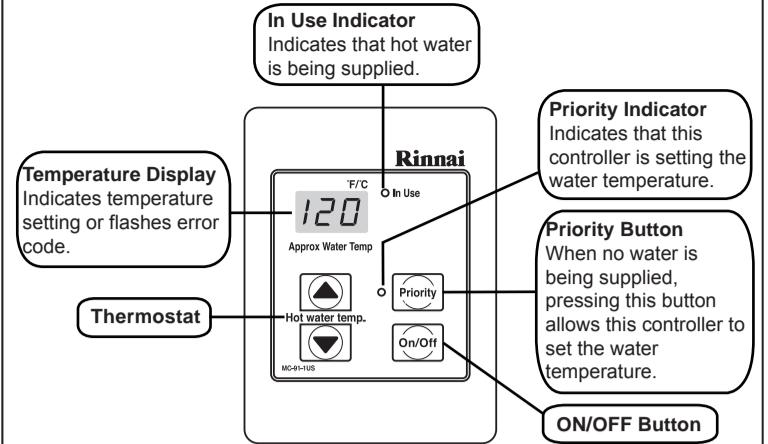


Remote Controller



Diagnostic Use of the Controller

1. To display error codes, press the ON/OFF button followed by the Δ thermostat button to cycle through the error codes.
2. To display the water flow through the water heater, press the Δ thermostat button (hold for 2 seconds) and then press the ON/OFF button while continuing to hold the Δ thermostat button.
3. To display the outlet water temperature, press the ∇ thermostat button (hold for 2 seconds) and then press the ON/OFF button while continuing to hold the ∇ thermostat button.

To Change the Temperature Scale (°F / °C)

With the water heater turned off, press and hold the ON/OFF button until the display changes to the other temperature scale (about 5 seconds).

To Turn Off the Controller Sound (Mute)

To turn the sound off (mute), press and hold both the Δ and ∇ thermostat buttons until a "beep" is heard (about 5 seconds).

Gas Pressure Setting

NOTE: For additional installation and commissioning information refer to the Operation and Installation Manual.

WARNING

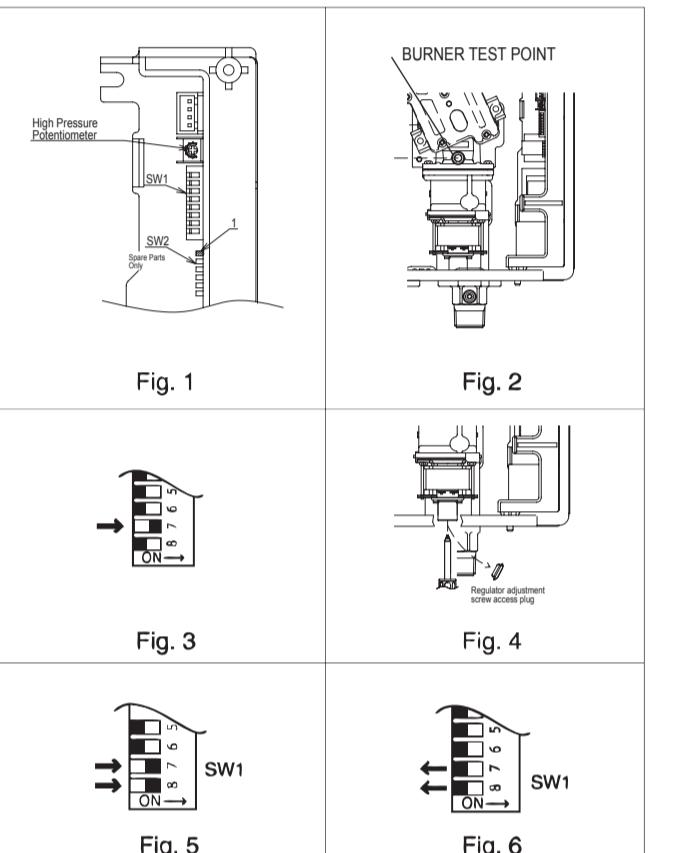
This appliance must be installed, serviced and removed by a trained and qualified person. During pressure testing of the consumer piping, ensure gas valve is turned off before unit is shut off. Failure to do so may result in serious injury to yourself or damage to the unit.

APPLIANCE OPERATING PRESSURES

	Table 1			
	Water Inlet Max	Gas Inlet Min/Max		Forced Low
	NAT.G	LPG	NAT.G	LPG
R50LSi			2.0" W.C.	3.2" W.C.
R75LSi	150 PSI	5" W.C. /10.5" W.C.	8" W.C. /13.5" W.C.	0.52" W.C. /0.92" W.C.
R94LSi			2.7" W.C. /4.4" W.C.	3.3" W.C. /5.0" W.C.

Commissioning

With all gas appliances in operation at maximum gas rate, the flowing inlet pressure at the incoming test point on the Rinnai water heater should read 5" W.C. - 10.5" W.C. on natural gas and 8" W.C. - 13.5 W.C. on propane gas. If the pressure is lower, the gas supply is inadequate and the unit will not operate to specification. Check the gas meter regulator and pipework for correct operation/sizing and correct as required.



Troubleshooting

Important Safety Notes

There are a number of (live) tests that are required when fault finding this product. Extreme care should be used at all times to avoid contact with energized components inside the water heater. Only trained and qualified service technicians should attempt to repair this product. Before checking for resistance readings, disconnect the power source to the unit and isolate the item from the circuit (unplug it).

SV1, SV2, SV3 and PVO Gas valve and Modulating solenoids: (Set meter above 2K)

Wire color	Voltage	Resistance	Connector #	Pin #'s
(Main) Pink - Black	11 ~ 13 VDC	36.8 ~ 44.8 ohms	H5	6 - 7
(SV1) Black - Yellow	11 ~ 13 VDC	36.8 ~ 44.8 ohms	H6	5 - 6
(SV2) Black - Blue	11 ~ 13 VDC	36.8 ~ 44.8 ohms	H7	4 - 6
(SV3) Black - Brown	11 ~ 13 VDC	36.8 ~ 44.8 ohms	H8	3 - 6
(PVO) Pink - Pink	2 ~ 15 VDC	67 ~ 81 ohms	H3	9 - 10

(M) Water Flow Control Device Servo or Geared Motor:

Red - Blue	11 ~ 13 VDC	22 ~ 28 ohms	F7	9 - 10
Grey - Brown	4 ~ 6 VDC	N/A	F7	5 - 7
Grey - Yellow	N/A	N/A	F7	5 - 8

NOTE: The grey wire listed above turns to black at F connector on the PCB.

(QS) Water Flow Sensor:

Black - Red	11 ~ 13 VDC	5.5 ~ 4.2 K ohms	F2	1 - 3
Yellow - Black	4 ~ 7 VDC	1 ~ 1.4 Mega ohms	F2	2 - 3

By-pass Flow Control (By-pass servo model ONLY):

Brown - White	N/A	G1	1 - 5
Orange - White	2 ~ 6 VDC	G1	2 - 5
Yellow - White	(Unit in operating mode)	G1	3 - 5
Red-White - Ground		G1	4 - 5

(IG) Ignition System:

Grey - Grey	90 ~ 110 VAC	N/A	C1	1 - 2
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(FM) Combustion Fan Motor:

Red - Black	6 ~ 45 VDC	N/A	E1	1 - 2
White - Black	5 ~ 10 VDC	9.2 ~ 9.4 K ohms	E1	2 - 4
Yellow - Black	11 ~ 13 VDC	3.5 ~ 3.9 K ohms	E1	2 - 3

Set your meter to the hertz scale. Reading across the white and black wires at terminals 2 and 4 you should read between 60 and 420 hertz.

Thermal Fuse / Overheat Switch:

Red - Red	11 ~ 13 VDC	Below 1 ohms	F6	H1	F6 - H12
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Flame Rod:

Place one lead of your meter to the flame rod and the other to ground.

With the unit running you should read between 5-150 VAC. Set your meter to the μ amp scale and series your meter in line with the flame rod. You should read 1 μ amp or greater for proper flame circuit. In the event of low flame circuit remove the flame rod and check for carbon or damage.

Heat Exchanger and Outgoing Water Temperature Thermistors:

Check all thermistors by inserting meter leads into each end of the thermistor plug. Set your meter to the 20 K scale and read resistance. Applying heat to the thermistor bulb should decrease the resistance. Applying ice to the thermistor bulb should increase the resistance. See below for examples of typical temperatures and resistance readings.

Example: $59^{\circ}\text{F} = 11.4 \sim 14\text{KQ}$ $140^{\circ}\text{F} = 2.2 \sim 2.7\text{KQ}$
 $86^{\circ}\text{F} = 6.4 \sim 7.8\text{KQ}$ $221^{\circ}\text{F} = 0.6 \sim 0.8\text{KQ}$
 $113^{\circ}\text{F} = 3.6 \sim 4.5\text{KQ}$

Outgoing Water Thermistor:

White - White | N/A | See example above | F5 | 3 - 4

Heat Exchanger Temperature Thermistor:

Pink - White | N/A | See example above | F4 | 3 - 11

Intake Air Thermistor (Indoor model ONLY):

Orange - White | N/A | See example above | F3 | 3 - 12

Surge Protector:

Black - White | 108 ~ 132 VAC | N/A | D2 | 1 - 3

Blue - Brown | 108 ~ 132 VAC | N/A | D1 | 1 - 3

With the power off you can check the continuity through the surge protector. Place a meter lead on the top pin #1 of the surge protector and pin #3 on the bottom of the surge protector. Check across the top pin #3 and bottom pin #1. If you read continuity across these two points then the surge protector is good. If you do not get continuity then replace the surge protector.

Remote Controls:

Terminals B1 | 10 ~ 13 VDC | 1.5 ~ 3.0 K ohms | B | 1 - 3

Frost Protection:

This unit has frost protection heaters mounted at different points to protect the water heater from freezing. The heaters located on the hot water outlet line should have a resistance reading of 180-207 ohms through each of these heaters. The heater located on the heat exchanger piping should have a resistance reading of 156-180 ohms and the one located in the water flow sensor valve should have a resistance reading 24-28 ohms.

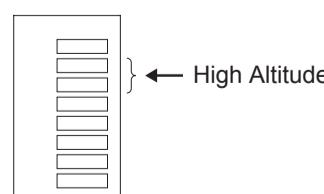
Amp Fuses:

This unit has two inline (3) amp glass fuses. Remove the fuse and check continuity through it. If you have continuity through the fuse then it is good. Otherwise the fuse is blown and must be replaced.

Dip Switches Settings

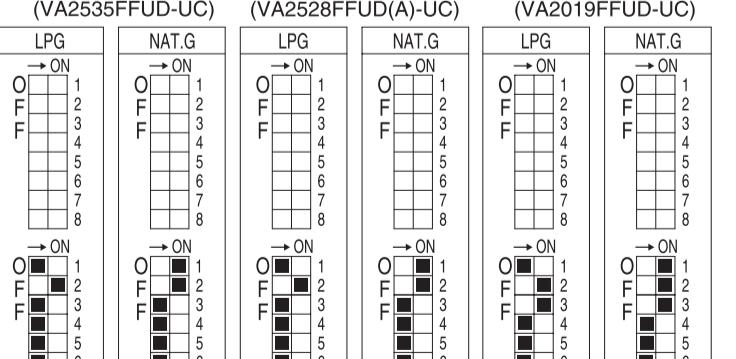
The original PC boards on the water heaters do not have the bank of 6 dip switches. Only spare PC boards have this bank.

Water heaters with a model name ending in "-UC" are con gured with the maximum temperature set to 120°F (49°C) from the factory. Temperature settings from 125-140°F (52-60°C) are available by setting dip switch 6 to ON in the SW1 bank of 8 dip switches.



WARNING

DO NOT adjust the other dip switches unless specifically instructed to do so. Incorrect Dip Switch Settings can cause the Rinnai water heater to operate in an unsafe condition and may damage the water heater and void the warranty.



SW No.	NOTES							
2	High Altitude	Off	Level 0	Off	Level 1	On	Level 2	On
		(0-2000ft)		2001-5200ft		5201-7700ft		7701-10200ft
3		Off		On		(610-1585m)		(2347-3109m)

Error Codes

02 No burner operation during freeze protection mode

- Service Call

03 Power interruption during Bath fill (Water will not flow when power returns)

- Turn off all hot water taps. Press ON/OFF twice.

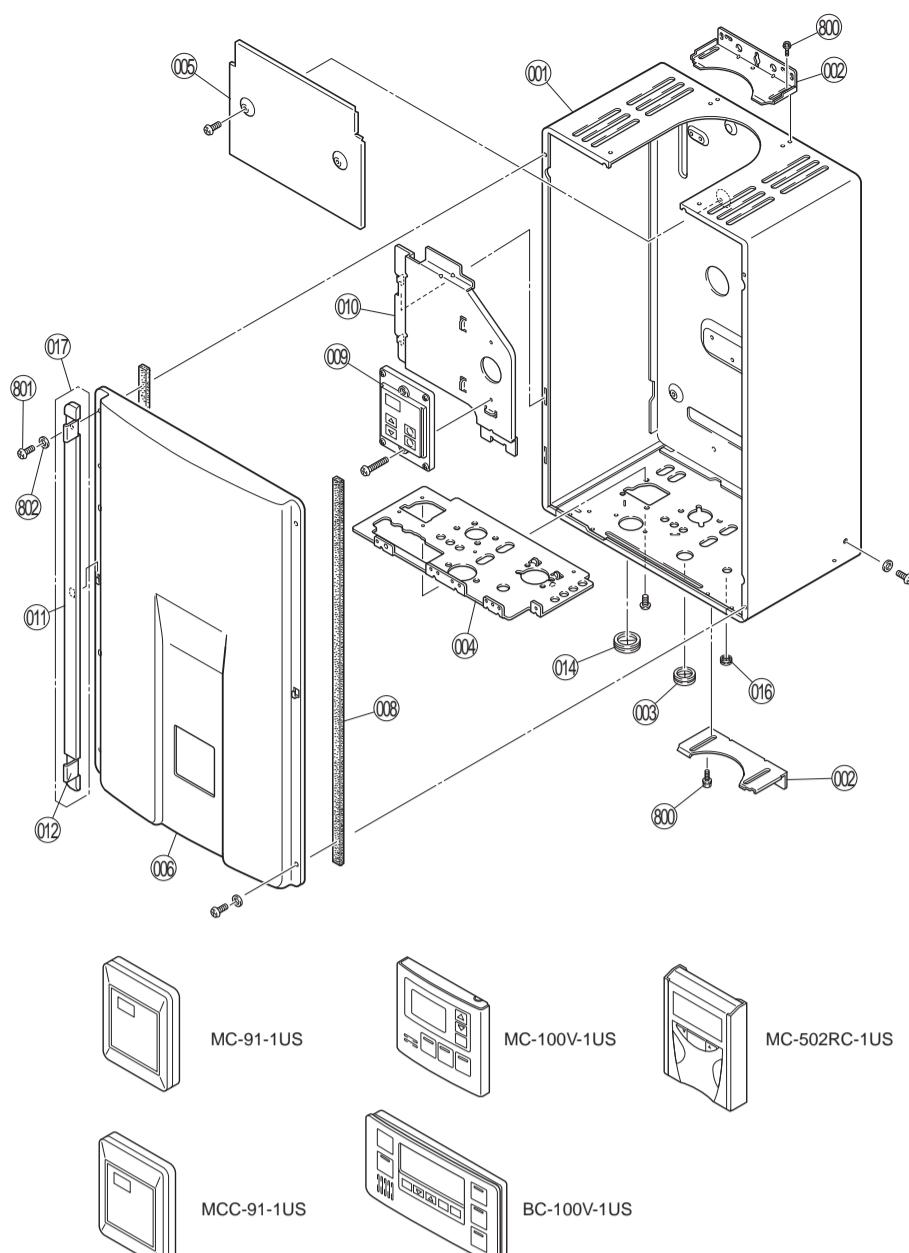
10 Air Supply or Exhaust Blockage

- Ensure Rinnai approved venting materials are being used.
- Check that nothing is blocking the flue inlet or exhaust.
- Check all vent components for proper connections.
- Ensure vent length is within limits.
- Ensure condensation collar was installed correctly.
- Verify dip switches are set properly.
- Check fan for blockage.

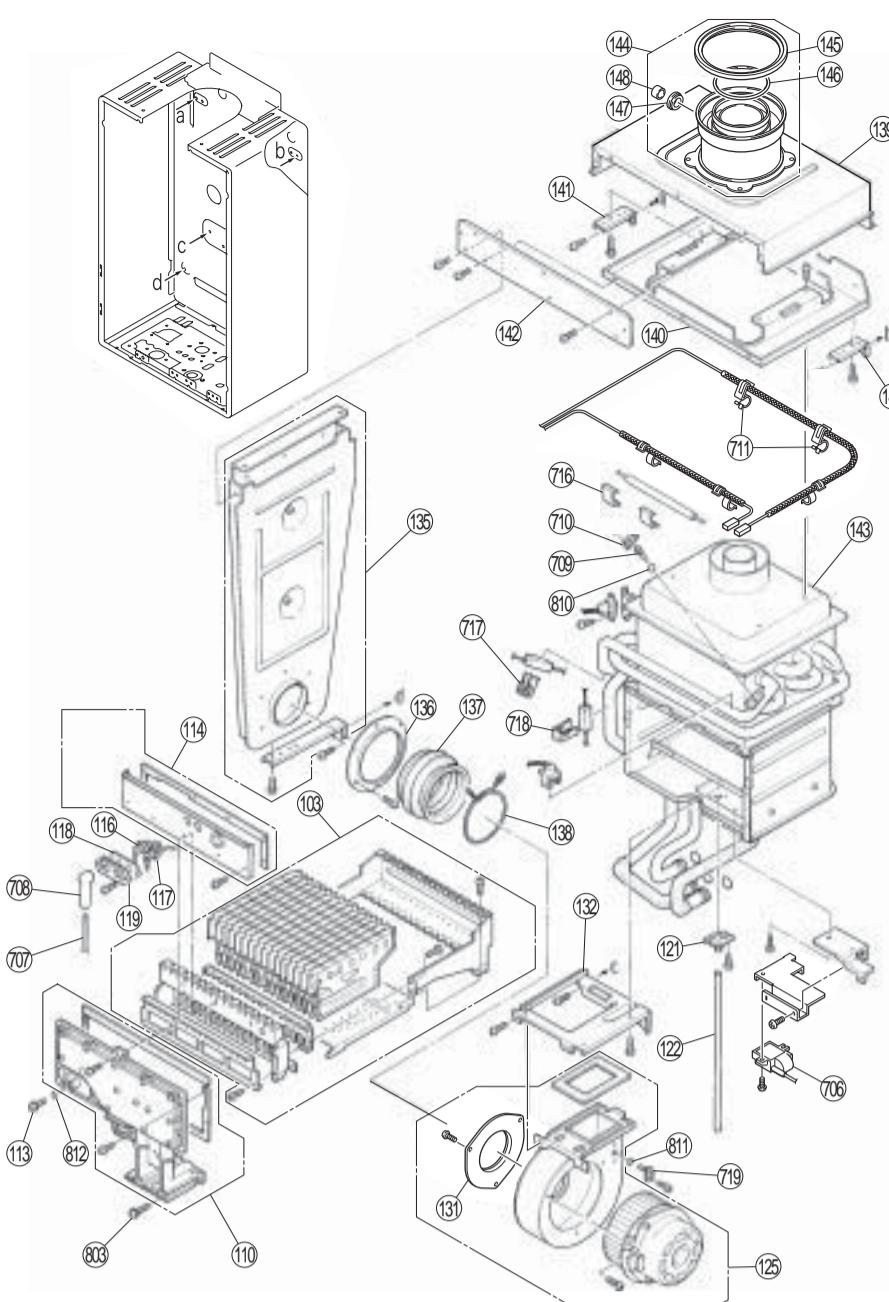
11 No Ignition

<li

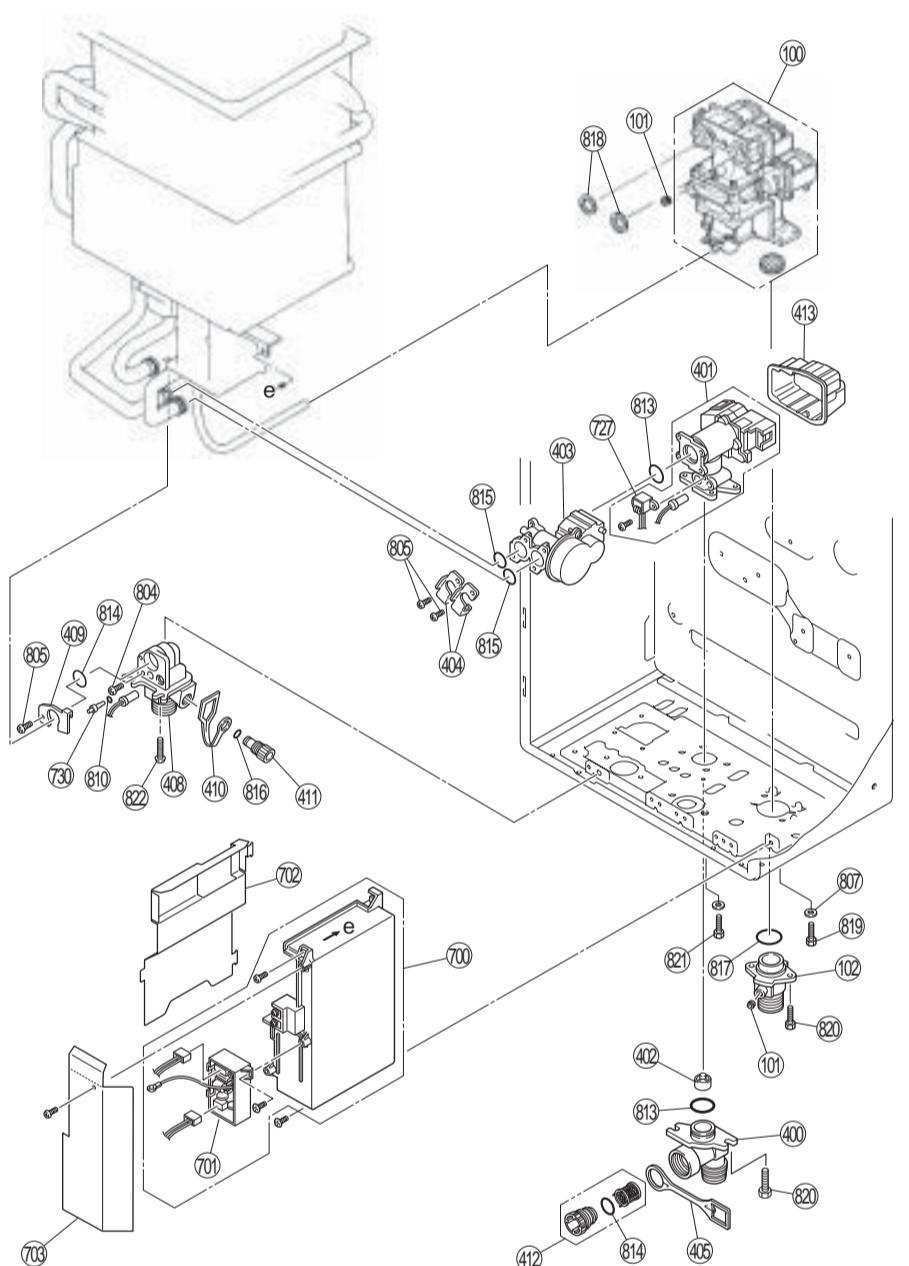
EXPLODED VIEW - CABINET



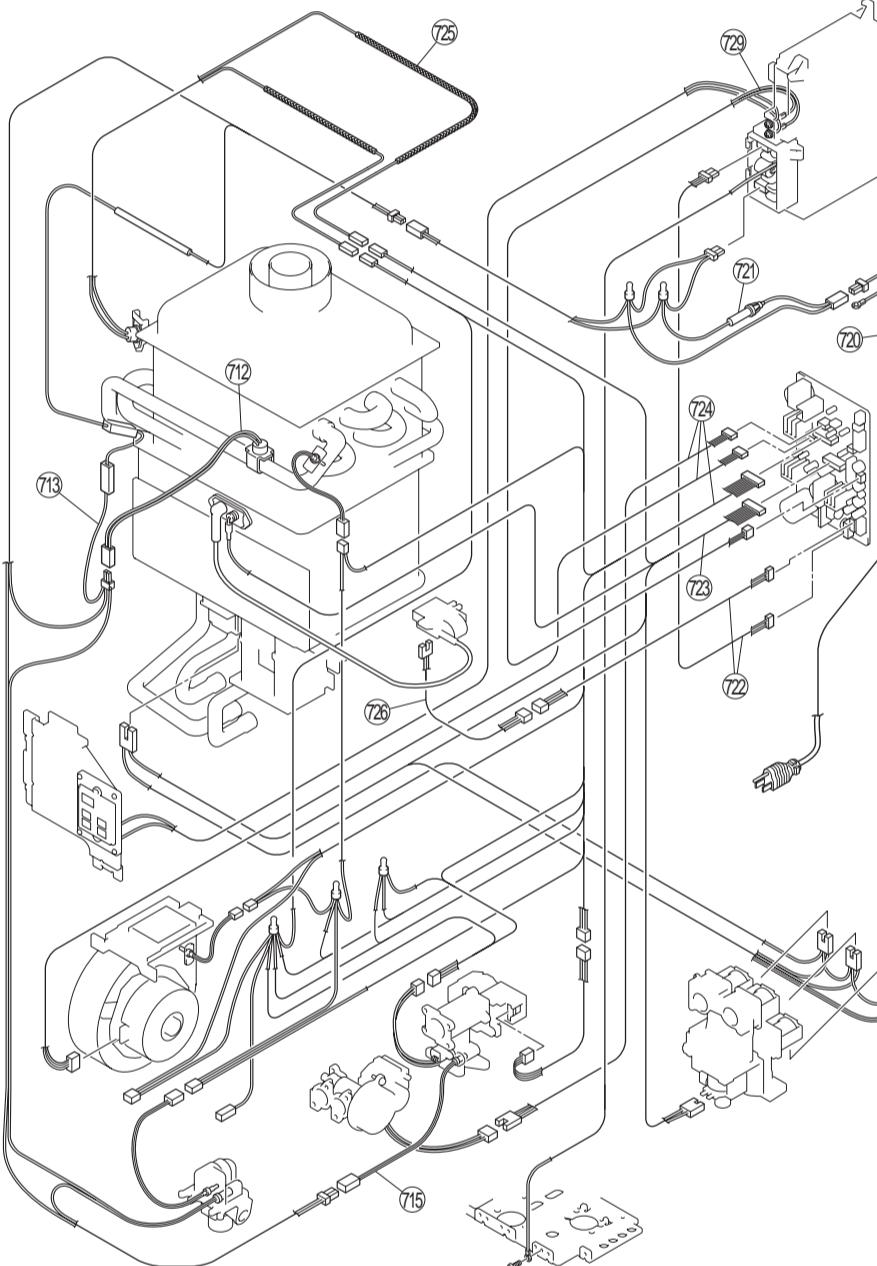
EXPLODED VIEW - INTERNALS



EXPLODED VIEW - INTERNALS



EXPLODED VIEW - ELECTRICAL



PARTS LIST

Number	Description	Parts Number	Quantity			Number	Description	Parts Number	Quantity			Number	Description	Parts Number	Quantity		
			R94LSi	R75LSi	R50LSi				R94LSi	R75LSi	R50LSi				R94LSi	R75LSi	R50LSi
001	Main Body (FF)	109000010	1	1	1	141	Joint Exhaust Tube Frame Supporter	U245-435	2	2	2	716	Antifrost Heater Clip B	CF29-742	2	2	2
002	Wall mounting bracket	109000024	2	2	2	142	Air Inlet Box Cover	U245-419	1	1	1	717	Antifrost Heater Clip A	AU111-653	1	1	1
003	Rubber Bushing	U245-125	1	1	1	143	Heat Exchanger Assembly	107000010	1	-	-	718	Antifrost Heater Clip C	AU100-721	1	1	1
004	Connection Reinforcement Panel	109000023	1	1	1	143	Heat Exchanger Assembly	107000011	-	1	1	719	Inlet Air Thermistor	105000029	1	1	1
005	Heat Protection Plate	U245-107	1	1	1	144	Flue Connection Assembly	108000015	1	1	1	720	Power Cord	CP-90580	1	1	1
006	Front Panel	109000012	1	1	1	144	Flue Connection Assembly-Male (optional)	108000016	1	1	1	721	Fuse Harness(FF)	105000069	1	1	1
008	Front Panel Gasket-1	U245-3185-1	2	2	2	145	O-ring	108000017	1	1	1	722	Power Harness	105000033	1	1	1
009	Remote Controller Ass'y	MC-91-1US-S-FLVA	1	1	1	146	O-ring	108000018	1	1	1	723	Solenoid Valve Harness	105000034	1	1	1
010	Remote Controller Bracket	103000011	1	1	1	147	Pipe Seal	108000019	1	1	1	724	Sensor Harness	105000035	1	-	-
011	Side Cover	U245-3121X05	2	2	2	148	Cap	108000020	1	1	1	724	Sensor Harness	105000036	-	1	1
012	Side Cover Rid	U245-3122X02	4	4	4	400	Water Inlet (3/4" NPT)	H73-501-2	1	1	1	725	Thermal Fuse Harness Assembly	105000039	1	1	1
014	Rubber Bushing	CF79-41020-A	1	1	1	401	Water Flow Servo & Sensor Assembly	107000014	1	-	-	726	Ignitor Harness	105000040	1	1	1
016	Packing	AU105-113	1	1	1	401	Water Flow Servo & Sensor Assembly	107000015	-	1	1	727	Flow Sensor	105000041	1	1	1
017	Side Cover Assy	109000022	2	2	2	402	Rectifier	M8D1-15X01	1	1	1	729	Remote Controller Harness	105000042	1	1	1
100	Gas Control Assembly	106000010	1	1	1	403	By-pass Servo Assembly	M6J-14	1	-	-	730	Thermistor	H111-650	1	1	1
101	Test Port Set Screw	AU39-965X01	2	2	2	404	Stop Bracket	AH69-310	2	-	-	800	Screw	ZIHD510UK	8	8	8
102	Gas Connection (3/4" NPT)	CU195-1866	1	1	1	404	Stop Bracket	AU195-321X01	-	1	1	801	Screw	CP-30580	4	4	4
103	Burner Unit Assembly (LPG)	106000011	1	1	1	405	Plug Band	109000018	1	1	1	802	Resin Washer	CF83-41430	4	4	4
103	Burner Unit Assembly (NG)	106000012	1	1	1	408	Hot Water Outlet (3/4" NPT)	U245-865-3	1	1	1	803	Screw	108000021	3	3	3
110	Manifold Assembly (LPG)	106000013	1	1	1	409	Stop Bracket	AU162-1876X01	1	1	1	804	Thermistor Stop Screw	U217-449	1	1	1
110	Manifold Assembly (FF-NG)	106000014	1	1	1	410	Plug Band (small)	109000019	1	1	1	805	Screw	ZAA0408UK	3	2	2
113	Pressure Point Sealing Screw	C10D-5	1	1	1	411	Drain Valve	107000021	1	1	1	810	O-ring	M10B-2-4	2	2	2
114	Combustion Chamber Sightglass Plate	106000016	1	1	1	412	Water Filter Assembly	H98-510-S	1	1	1	811	O-ring	M10B-2-3	1	1	1
116	Electrode	H73-120	1	1	1	413	Cover	109000020	1	1	1	812	O-ring	M10B-13-4	1	1	1
117	Flame Rod	105000010	1	1	1	700	PCB	105000071	1	-	-	813	O-ring	M10B-2-18	2	1	1
118	Electrode Packing	AH66-398X01	1	1	1	700	PCB	105000072	-	1	1	814	O-ring	M10B-2-16	2	2	2
119	Electrode Holder	AH66-393	1	1	1	701	Surge Protector	105000067	1	1	1	815	O-ring	M10B-2-14	2	1	1
121	Tube Joint	U242-312	1	1	1	702	Surge Protector with terminal (optional)	BU195-1873-2	1	1	1	816	O-ring	M10B-2-7	1	1	1
122	Vent Tube	AU161-665-CX01	1	1	1	703	PCB Cover-side	105000015	1	1	1	817	O-ring	M10B-1-24	1	1	1
125	Fan Motor All Assembly	108000010	1	1	1	706	PCB Cover-front	105000017	1	1	1	818	Packing	C36E1-6	2	2	2
131	Rubber Boot Bracket Right	U245-566	1	1	1	707	Ignitor	105000068	1	1	1	819	Screw	ZAG0512UK	2	2	2
132	Combustion Chamber Fan Bracket	U245-255X01	1	1	1	708	High Tension Cord	105000019	1	1	1	820	Screw	ZQAA0514UK	4	4	4
135	Air Inlet Box All Assembly	108000013	1	1	1	709	Electrode Sleeve	AU206-218	1	1	1	821	Screw	ZQAA0508UK	2	2	2
136	Rubber Boot Bracket Left	U245-408	1	1	1	710	Thermistor	105000020	1	1	1	822	Screw	ZBA0512UK	3	3	3
137	Rubber Boot	U245-409X01	1	1	1	711	Thermistor Clip Large	CP-90172	1	1	1	888	Manual	100000113	1	1	1
138	Rubber Boot Clamping Ring	U245-567	1	1	1	712	Thermal Fuse Clip	U217-676X02	5	5	5	889	Tech Sheet	100000115	1	1	1
139	Air Inlet Duct	108000014	1	1	1	713	Frost Sensing Switch	U242-511	1	1	1	900	Front Panel Label (94)	100000014	1	-	-
140	AirInlet Box Frame	U245-434X02	1	1	1	715	Anti Frost Heater (120V)	105000022	1	1	1	900	Front Panel Label (75)	100000015	-	1	-
						715	Valve Heater (120V) Assembly	105000024	1	1	1	900	Front Panel Label (50)	100000017	-	-	1